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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

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Sheet

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of

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Complete if Known

Application Number	09/393,998
Filing Date	September 8, 1999
First Named Inventor	Craig Culver
Art Unit	2629
Examiner Name	Boddie, William
Attorney Docket Number	IMM060.RE

U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No. ¹	Document Number Number - Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1.	US- 4,712,101	12/8/1987	Culver	
	2.	US- 4,868,549	9-19-1989	Affinito et al.	
	3.	US- 5,004,391	4-2-1991	Burdea	
	4.	US- 5,450,079	9-12-1995	Dunaway	
	5.	US- 5,506,605	4-9-1996	Paley	
	6.	US- 5,631,669	5-20-1997	Stobbs et al.	
	7.	US- 5,691,898	11-25-1997	Rosenberg et al.	
	8.	US- 5,825,308	10-20-1998	Rosenberg	
	9.	US- 5,914,705	6-22-1999	Johnson et al.	
	10.	US- 5,956,016	9-21-1999	Kuenzner et al.	
	11.	US- 6,069,614	5-30-2000	Singhal	
	12.	US- 6,107,992	8-22-2000	Ishigaki	
	13.	US- 6,184,862	2-6-2001	Leiper	
	14.	US- 6,256,011	7-3-2001	Culver	
	15.	US- 6,300,936	10-9-2001	Braun et al.	
	US-				
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ⁴ - Number ⁵ - Kind Code ⁶ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁸
	16.	EP 0349086	1-3-1990	Stork Kwant B.V.		
	17.	JP 01-003664	7-19-1990	Taito Corp.		
	18.	JP 02-109714	1-13-1992	Epoch Co. and Key-Planning Co.		
	19.	JP 04-007371	8-3-1993	Taito Corp.		
	20.	JP 05-193862	1-27-1995	Sega Corp.		

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Sheet 2 of 5

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NON PATENT LITERATURE DOCUMENTS

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	21.	BAIGRIE, "Electric Control Loading - A Low Cost, High Performance Alternative," Proceedings, pp. 247-254, November 6-8, 1990.	
	22.	BROOKS et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11, NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985.	
	23.	BURDEA et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, 05/02/1993.	
	24.	CALDWELL et al., " Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993.	
	25.	GOTOW et al., " Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11-00, pp. 332-337, 1989.	
	26.	JONES et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-156, 1990.	
	27.	OUH-YOUNG, " Force Display in Molecular Docking," Order No. 9034744, p. 1-369, 1990.	
	28.	RUSSO, " Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992.	
	29.	SNOW et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. MPO-17851; JPL Case No. 5348, pp. 1-4, 06/15/1989.	
	30.	STANLEY et al., " Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992.	
	31.	TADROS, " Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators", MIT Archive © Massachusetts Institute of Technology, pp. 1-88, February 1990.	

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Sheet 3 of 5

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	32.	ADELSTEIN, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989.	
	33.	BEJCZY, "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM-IFToMM, Sep. 8-12, 1981.	
	34.	BEJCZY, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980.	
	35.	EBERHARDT et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," IEEE Virtual Reality Annual International Symposium, Seattle, WA, Sep. 18-22, 1993.	
	36.	HOWE, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992.	
	37.	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990.	
	38.	JACOBSEN et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991.	
	39.	KONTARINIS et al., "Display of High-Frequency Tactile Information to Teleoperators," Telemomanipulator Technology and Space Telerobotics, Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993.	
	40.	MCAFEE, "Teleoperator Subsystem/Telerobot Demonsdrator: Force Reflecting Hand Controller Equipment Manual," JPL D-5172, pp. 1- 50, A1-A36, B1-B5, C1-C36, January 1988.	
	41.	MINSKY, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, June 1995.	
	42.	PATRICK et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui J. deFigueiredo et al., Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990.	
	43.	RABINOWITZ et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contactor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987.	
	44.	SHIMOGA, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30 - Oct. 1, 1992.	
	45.	TERRY et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988.	

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Sheet 4 of 5

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Examiner Name	Boddie, William
Attorney Docket Number	IMM060RE

NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	46.	"Cyberman Technical Specification," Logitech Cyberman SWIFT Supplement, 4/5/1994.	
	47.	AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.	
	48.	BEJCZY et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989.	
	49.	BEJCZY et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980.	
	50.	BEJCZY, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/031850.1 00 1987 IEEE, 1987.	
	51.	EBERHARDT et al., "Including Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, Dynamic Systems and Control: Volume 1, ASME 1994.	
	52.	GOBEL et al., "Tactile Feedback Applied to Computer Mice," International Journal of Human-Computer Interaction, Vol. 7, No. 1, pp. 1-24, 1995.	
	53.	KACZMAREK et al., "Tactile Displays," Virtual Environment Technologies, 1995.	
	54.	MARCUS, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994.	
	55.	OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95, Seoul, Korea, 21-24 August 1995.	
	56.	OUHYOUNG, "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," IEEE Transactions on Consumer Electronics, Vol. 41, No. 3, August 1995.	
	57.	PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 nd Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.	
	58.	SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994	
	59.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed June 28, 2006.	

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Sheet 5 of 5

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Application Number	09/393,998
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	60.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed January 1, 2006.	
	61.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed June 1, 2005.	
	62.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed September 29, 2004.	
	63.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed February 25, 2004.	
	64.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed July 29, 2003.	
	65.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, mailed January 13, 2003.	
	66.	United Sates Patent and Trademark Office, Office Action, Application No. 09/875,458, May 30, 2002.	
	67.	United Sates Patent and Trademark Office, Office Action, Application No. 11/594,668, mailed March 26, 2010.	
	68.	United Sates Patent and Trademark Office, Office Action, Application No. 11/594,668, mailed October 20, 2009.	

Examiner Signature	/William Boddie/	Date Considered	07/13/2010
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